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opment of the elater, so characteristic of the Collembola, indicating, as it seems to me, that that organ, in the genera in which it is absent or rudimentary, has been lost through degeneration; and thirdly, because the egg is more decidedly meroblastic or teleplasmic than that of Isotoma.—*John A. Ryder.*

PHYSIOLOGY.[1]

REPORT OF COMMITTEE ON DISINFECTANTS OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.—A little more than a year ago the Public Health Association, stirred up by the prospective speedy advent of cholera in this country, took steps to arm both practitioners of medicine and the public at large against not only that disease but all ailments supposed to owe their existence to "germs." A committee was appointed consisting of Drs. Sternberg and Smart, of the Army, Raymond, of Brooklyn, Vaughan, of Ann Arbor, Leeds, of New Jersey, Watkins, of New Orleans, and Rohé, of Baltimore, to investigate the efficiency of the various obtainable germicides and antiseptics in respect to sanitation and preventive medicine. Probably no more competent and conscientious workers than are some, if not all of the members of this committee, could have been chosen to carry out this difficult undertaking. The report opens by clearing away a common confusion of terms. An *antiseptic* is a substance which simply prevents or arrests the development of bacterial organisms; a *disinfectant* or *germicide* is a substance which kills them. All disinfectants are antiseptics, but not all antiseptics are disinfectants. The work of the committee was limited to the study of the disinfecting properties of the substances investigated.

The report consists partly of the descriptions of original experiments, and partly of historical essays, embodying the results of the most trustworthy investigators in this field. The general reader would search in vain the mass of bacteria literature to find some definite idea of the comparative value of different disinfectants; but in the work before us the confusion is reduced to a minimum, because the many different substances investigated are considered from the same standpoint and after the same methods. It means very little when one experimenter declares that chromic acid, for example, is an antiseptic in the proportion 1 : 1000, and another that carbolic acid has the same power when of the strength 1 : 500; for the more concentrated the strength of the germ-food solution the greater must be the concentration of the antiseptic to be efficient, and a percentage of antiseptic, that would prevent the development of germs for the space of three days, might be lived down by bacteria in the course of six.

Mercuric chloride as a disinfectant easily stands at the head of substances readily obtainable. As this substance is a violent poison objection has been made to its use that when thrown into vaults it might soak through the earth and contaminate the drinking water in wells or cisterns; Dr. Vaughan, however, has shown that when solutions of mercuric chloride are filtered through various kinds of soil, the filtrate contains no trace of mercury; the bichloride having probably been decomposed in the earth, the mercury forming insoluble salts with carbonates and phosphates with which it has come into contact. Its destructive action on lead pipes presents one important objection to the domestic use of the mercury salt. Some bacterial organisms reproduce themselves by means of spores, and these latter are very much more resistant toward germicidal influence than are the active organisms. The conclusions arrived at by the committee are of so great practical importance and are so concisely stated that they will be stated here nearly *in extenso.*

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[1] This department is edited by Professor HENRY SEWALL, of Ann Arbor, Michigan.

The most useful agents for the destruction of spore-containing infectious material are: 1. *Fire.* Complete destruction by burning. 2. *Steam under pressure.* 110° C. (230° Fahr.) for ten minutes. 3. *Boiling in water* for one hour. 4. *Chloride of lime.* 1 to 4 per cent solution. 5. *Mercuric chloride.* A solution of 1 : 500.

For the destruction of infectious material which owes its infecting power to micro-organisms *not containing spores,* the committee recommends: 1. *Fire.* Complete destruction by burning. 2. *Boiling in water* half an hour. 3. *Dry heat.* 110° C. (230° Fahr.) for two hours. 4. *Chloride of lime.* 1 to 4 per cent solution. 5. *Solution of chlorinated soda.* 5 to 20 per cent solution. 6. *Mercuric chloride.* A solution of 1 : 1000 to 1 : 4000. 7. *Sulphur dioxide.* Expose for twelve hours to an atmosphere containing at least 4 volumes per cent of this gas, preferably in presence of moisture (this requires the combustion of 3 to 4 lbs. sulphur for every 1000 cubic feet of air space). 8. *Carbolic acid,* 2 to 5 per cent solution. 9. *Sulphate of copper,* 2 to 5 per cent solution. 10. *Chloride of zinc,* 4 to 10 per cent solution.

The committee would make the following recommendations with reference to the practical application of these agents for disinfecting purposes:

For excreta.—(*a*) In the sick room: For spore-containing material. 1. Chloride of lime in solution, 4 per cent. 2. Mercuric chloride in solution, 1 : 500 (the addition of an equal quantity of potassium permanganate as a deodorant and to give color to the solution is recommended). In the absence of spores; carbolic acid in solution, 5 per cent. 4. Sulphate of copper in solution, 5 per cent. 5. Chloride of zinc in solution, 10 per cent. (*b*) In privy vaults; mercuric chloride in solution, 1 : 500. Chloride of lime in powder (it is well to dilute by mixing with plaster of paris or clean sand).

For clothing, bedding, etc.—(*a*) Soiled underclothing, bed linen, etc. 1. Destruction by fire, if of little value. 2. Boiling for at least half an hour. 3. Immersion in solution of mercuric chloride of strength 1 : 2000 for four hours. 4. Immersion in a 2 per cent solution of carbolic acid for four hours. (*b*) Garments which would be injured by the above treatment: 1. Exposure to dry heat at a temperature of 110° C. (230° Fahr.) for two hours. 2. Fumigation with sulphurous acid gas for at least twelve hours, the clothing being freely exposed and the gas present in the disinfection chamber in the proportion of 4 volumes per cent. (*c*) Mattresses and blankets soiled by the discharges of the sick: 1. Destruction by fire. 2. Exposure to super-heated steam—25 lbs. pressure—for one hour (mattresses to be freely opened). 3. Immersion in boiling water for one hour. 4. Immersion in solution of mercuric chloride and sulphate of copper.

Furniture and articles of wood, leather and porcelain, washing, several times repeated, with: 1. Solution of mercuric chloride 1 : 1000. 2. Solution of chloride of lime, 1 per cent. 3. Solution of carbolic acid, 2 per cent.

For the person.—The hands and general surface of the body of attendants, of the sick and of convalescents at the time of their discharge from the hospital: 1. Solution of chlorinated soda 1 to 9 of water. 2. Carbolic acid, 2 per cent solution. 3. Mercuric chloride 1 : 1000; the latter recommended only for the hands or for washing away infectious material from a limited area, not as a bath for the entire surface of the body.

For the dead.—Envelope the body in a sheet thoroughly saturated with: 1. Chloride of lime in solution, 4 per cent. 2. Mercuric chloride in solution, 1 : 500. 3. Carbolic acid in solution, 5 per cent.

RECENT INVESTIGATIONS ON THE RESPIRATORY CENTER.—Our knowledge of the respiratory center dates from the work of Le Gallois, in the early part of this century. He located this center in the medulla oblongata, confining it indeed to a very limited portion of the medulla in the region of the origin of the vagus nerve. Flourens repeated Le Gallois's experiments and localized the center to a small spot in the gray matter at the level of the calamus scriptorius which he named the "nœnd vital." Later workers demonstrated that the respiratory center of the medulla is bilateral. Longitudinal sections along the middle line of the medulla do not prevent the respiratory movements from taking place. No part of physiology seems to have been more generally accepted than the existence of this center in the medulla, though its exact position has always been and is still a matter of controversy. In 1873 Gierke made a thorough investigation of the subject, his method being to make lessons of different portions of the medulla, as narrowly localized as possible; and after observing the effects of his section to harden the medulla and study the lesion by means of microscopic sections. He found that destruction of a small area in the region of the end of the calamus scriptorius on both sides was followed by a complete cessation of the respiratory movements. Microscopic study of this region convinced him that the spot whose destruction had this effect was a bundle of nerve fibers lying outside of the nucleus of the spinal accessory nerve and below the nucleus of the posterior pyramid. This result was of course very unsatisfactory. According to the present conceptions of physiologists nerve centers must always consist of nerve cells, and it is not conceivable that automatic stimuli can arise in nerve fibers. If investigations had rested here this collection of fibers could only be looked upon as the efferent fibers from a center whose location had not yet been determined.

Other physiologists have denied the existence of a respiratory center in the medulla, altogether holding that the centers governing the respiratory movements are situated in the spinal cord. While others have described respiratory centers in the floor of the third ventricle, or in the corpora quadrigemina in the gray matter surrounding the aqueduct of Sylvius. Two interesting communications on this subject have appeared recently in the Centralblatt f. Med. Wiss., Nos. 27 and 34, 1885. Unfortunately these investigations have given different results, so that we are still left in doubt as to the location of the medullary center, though it looks as if the problem was very near its final solution. The first communication, No. 27, is by Mislawsky. He states that Gierke's bundles have nothing to do with the respiratory movements. Injury to them in any part of their course does not prevent respiration. He localizes the respiratory centre in a number of nerve cells forming an irregular group on either side of the raphe, lying between it and the root of the hypoglossal nerve. The boundaries of this center lie between the base and point of the calamus scriptorius, from before back, and in a dorso-ventral direction between the olives and the gray substance of the floor of the fourth ventricle. Destruction of this centre on both sides completely stops the respiratory movements, while injury to one side affects the respiratory movements of that side alone. The efferent fibers from this center to the spinal origin of the nerves of the respiratory muscles lie outside of Gierke's bundle. In No. 347 of the Centralblatt, Gierke replies to Mislawsky's criticism. He states positively that the group of cells described by Mislawsky as the respiratory center does not exist; that the locality assigned to it is occupied entirely by the reticular formation, and it is the scattered cells of this formation which Mislawsky has mistaken for a definite nerve center. The disposition of the nerve cells in the reticular formation he finds to be very irregular in different mammalia, and in no case was there any collection of these cells that could be differentiated from the remaining cells of the formation.

Gierke states that his latest investigations have convinced him that the bundle of fibers previously described by him as the respiratory center contains in its whole extent a number of nerve cells, and these cells are in connection with the fibers of the bundles. This discovery takes away the theoretical objections to Gierke's previous results, and if his work can be corroborated will place the existence of a medullary respiratory center upon a satisfactory experimental basis.

Both communications are preliminary to more extensive papers, shortly to be published.—*W. H. Howell, Johns Hopkins University.*

PSYCHOLOGY.

INTELLIGENCE OF ANTHROPOID APES.—In his excellent work on anthropoid apes, Professor Hartman, the Berlin zoölogist maintains that anthropoid apes in nature "develop an intelligence which sets them high above the other mammals. They do not, however, display the keenness of scent and quickness of sight which distinguish some animals of a lower order, such as canine beasts of prey and ruminants manifest in many different ways. The structure of their nests is rude in comparison with that of some other mammals—as for example, of rodents. But we must not forget that several of the lower races of men, such as the degraded Bedja, the Obongo, the Fuegians, many aborigines of the Brazilian forests and the Australian black, scarcely rise above the inartificial structure of an anthropoid's nest in the construction of their huts."

The author quotes Falkenstein's description of a gorilla: "His good-humor and shyness, or rather roguishness, deserves special mention as his strongest characteristic. When he was chastized, as it was necessary to do at first, he never resented the punishment, but came up with a beseeching air, clinging to my feet, and looking with an expressive air which disarmed all displeasure. When he was anxious to obtain anything, no child could have expressed its wishes in a more urgent and caressing manner. If in spite of this he did not obtain what he wanted, he had recourse to cunning, and looked anxiously about to see if he was watched. It was just in these cases when he obstinately pursued a fixed idea, that it was impossible not to recognize a deliberate plan and careful calculation. If, for example, he was not allowed to leave the room, or, again, was not allowed to come in, he would, after several attempts to get his own way had been baffled, apparently submit to his fate, and lie down near the door in question, with assumed indifference. But he soon raised his head in order to ascertain whether fortune was on his side, edging himself gradually nearer and nearer, and then, looking carefully round, he twisted himself about until he reached the threshold; then he got up, peered cautiously round, and with one bound galloped off so quickly that it was difficult to follow him.

"He pursued his object with equal pertinacity when he felt a desire for the sugar or fruit which was kept in a cupboard in the eating-room; he would suddenly leave off playing and go in an